Colombian Healthcare Script

Anthony Castillo

12/18/2018

```
Month <- c("January","February","March","April","May","June",
           "July","August","September","October","November","December")
o15 <- c(14489821,14310456,15069465,14436777,14574324,13853701,
         14194579,13401918,15261916,14857724,13722286,12261158)
o16 <- c(13854393,14578786,13868580,14545539,14106406,14786688,
         14104114,15212744,15305727,14811890,14135918,13732632)
e16 <- c(13416131,14746508,13839207,14559989,13880713,14973023,
         14156210,15244339,15328005,14525576,14353717,14006863)
e17 <- c(13412145,16127110,15167461,15076455,15203234,14608610,
         15496872,14014742,14902690,16813581,14794402,14430747)
e18 <- c(14732409,16610465,15617830,15519966,15646749,15030010,
         15941619,14412470,15323592,17284574,15203621,14824555)
```

```
chart <- data.frame(Month,o15,o16,e16,e17,e18)
print(chart)
```

```
##        Month      o15      o16      e16      e17      e18
## 1    January 14489821 13854393 13416131 13412145 14732409
## 2   February 14310456 14578786 14746508 16127110 16610465
## 3      March 15069465 13868580 13839207 15167461 15617830
## 4      April 14436777 14545539 14559989 15076455 15519966
## 5        May 14574324 14106406 13880713 15203234 15646749
## 6       June 13853701 14786688 14973023 14608610 15030010
## 7       July 14194579 14104114 14156210 15496872 15941619
## 8     August 13401918 15212744 15244339 14014742 14412470
## 9  September 15261916 15305727 15328005 14902690 15323592
## 10   October 14857724 14811890 14525576 16813581 17284574
## 11  November 13722286 14135918 14353717 14794402 15203621
## 12  December 12261158 13732632 14006863 14430747 14824555
```

```
summary(o15)
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
## 12261158 13820847 14373616 14202844 14645174 15261916
```

```
sd(o15)
```

```
## [1] 817575.3
```

```
summary(o16)
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
## 13732632 14045230 14340728 14420285 14792988 15305727
```

```
sd(o16)
```

```
## [1] 532339.9
```

```
summary(e16)
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
```

```
## 13416131 13975326 14439646 14419190 14803137 15328005
```

```
sd(e16)
```

```
## [1] 589896
```

```
summary(e17)
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
## 13412145 14564144 14989572 15004004 15276644 16813581
```

```
sd(e17)
```

```
## [1] 899612.4
```

```
summary(e18)
```

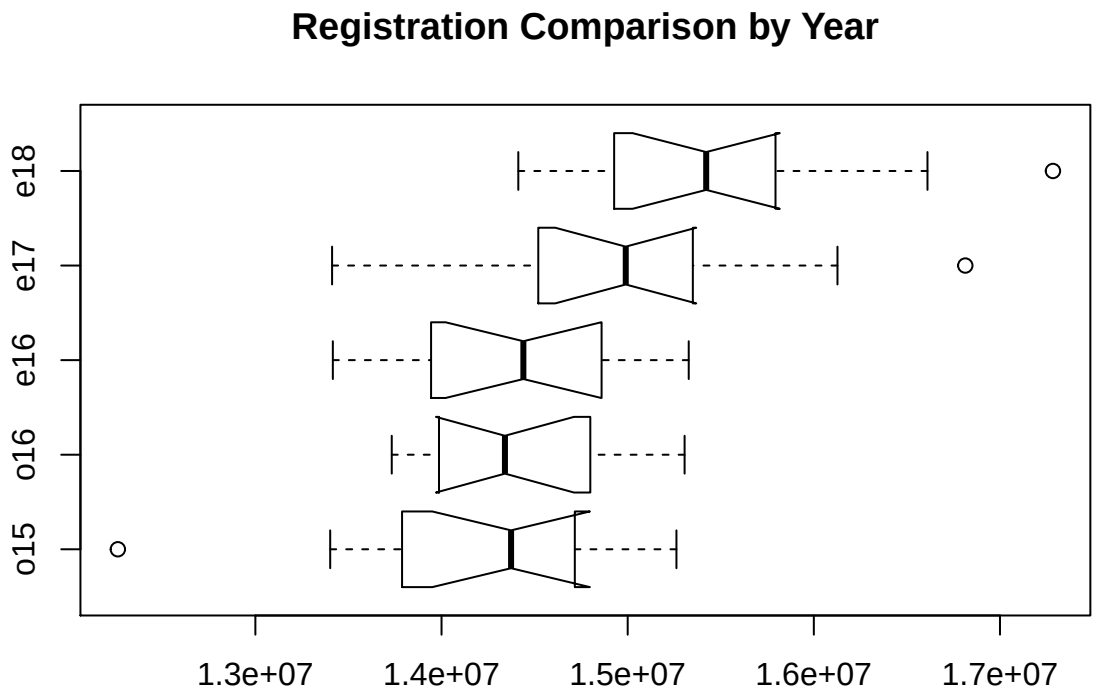
```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
## 14412470 14978646 15421779 15512322 15720466 17284574
```

```
sd(e18)
```

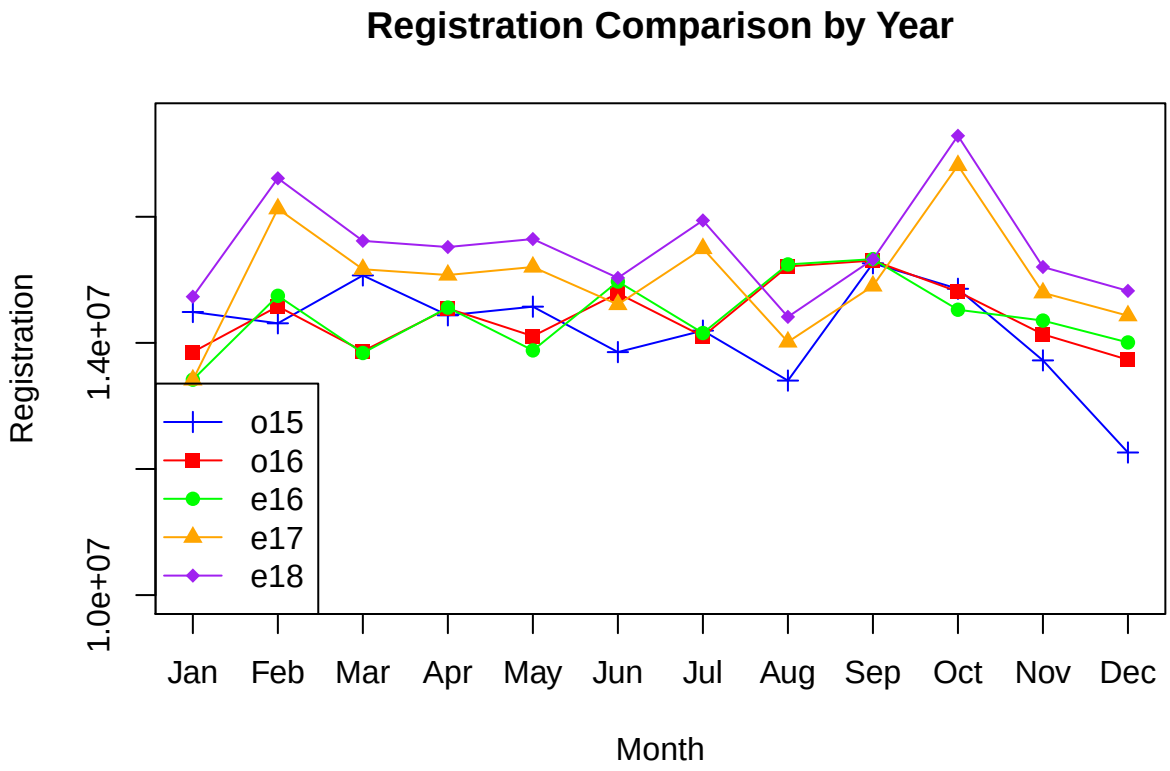
```
## [1] 809874
```

```
boxplot(o15,o16,e16,e17,e18, main="Registration Comparison by Year",
        names=c("o15","o16","e16","e17","e18"), horizontal=TRUE, notch=TRUE)
```

```
## Warning in bxp(list(stats = structure(c(13401918, 13787993.5, 14373616.5, :
## some notches went outside hinges ('box'): maybe set notch=FALSE
```



```
plot(x=c(1:12),o15,type="o",col="blue",pch=3,lty=1,
     ylim=c(10000000,17500000),main="Registration Comparison by Year",
     xlab="Month",ylab="Registration",xaxt='n')
axis(side=1, at=c(1:12), labels=c("Jan","Feb","Mar",
     "Apr","May","Jun","Jul","Aug","Sep","Oct","Nov","Dec"))
points(x=c(1:12),o16,col="red",pch=15)
lines(x=c(1:12),o16,col="red",lty=1)
points(x=c(1:12),e16,col="green",pch=16)
lines(x=c(1:12),e16,col="green",lty=1)
points(x=c(1:12),e17,col="orange",pch=17)
lines(x=c(1:12),e17,col="orange",lty=1)
points(x=c(1:12),e18,col="purple",pch=18)
lines(x=c(1:12),e18,col="purple",lty=1)
legend("bottomleft",legend=c("o15","o16","e16","e17","e18"),
       col=c("blue","red","green","orange","purple"), pch=c(3,15,16,17,18), lty=1)
```

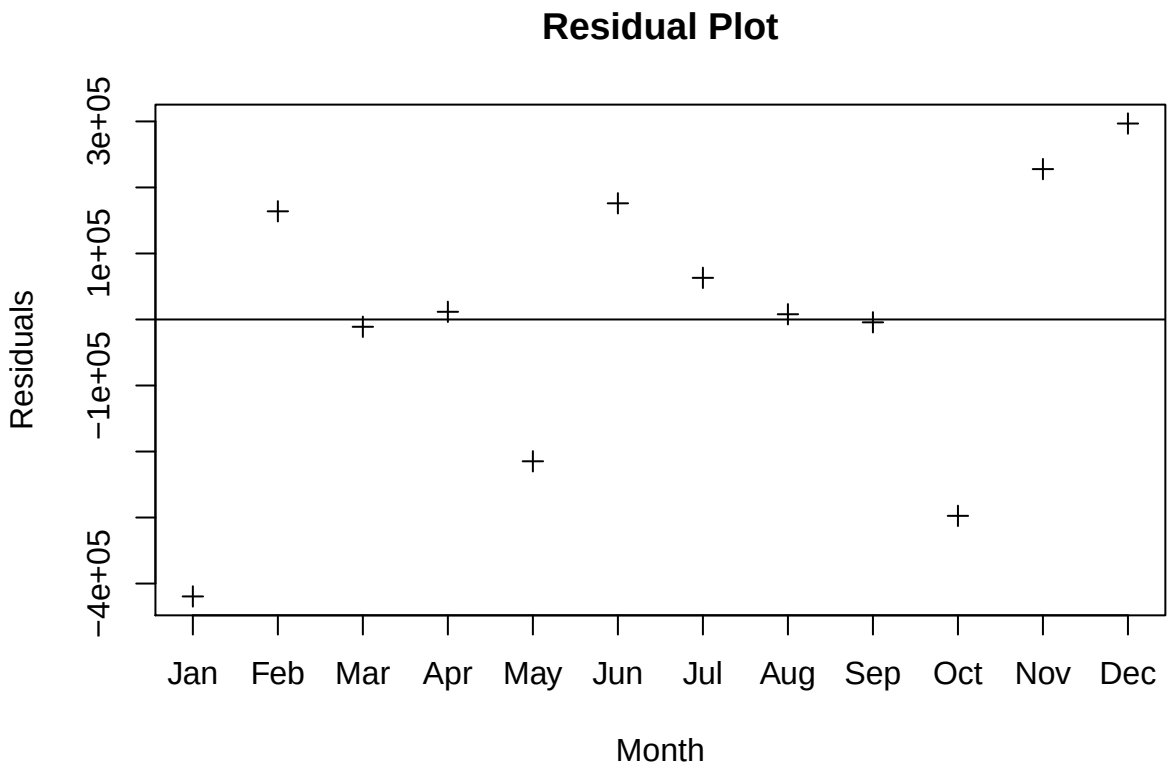



```
linmod <- lm(e16~o16)
resid(linmod)
```

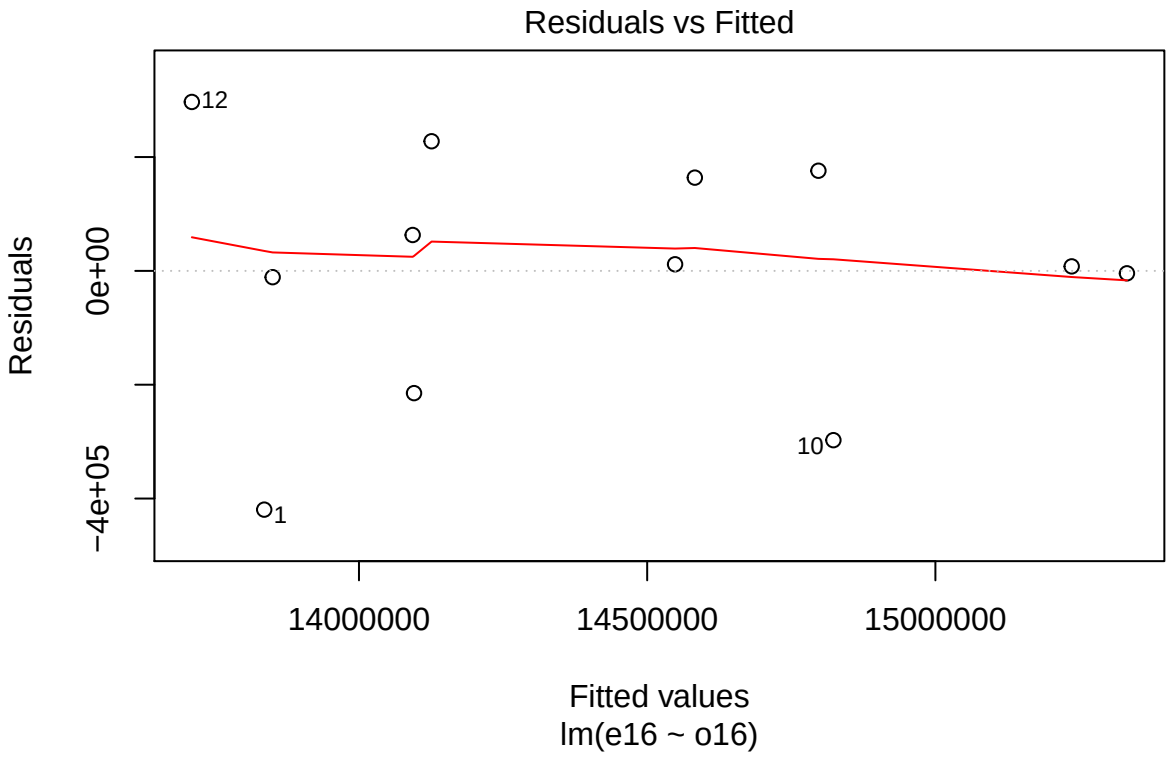
```
##           1           2           3           4           5           6
## -419489.003  163865.123  -11043.201   11631.752 -214792.832  175983.312
##           7           8           9          10          11          12
##   63067.770    7933.418   -4288.349 -297452.993  227777.220  296807.783
```

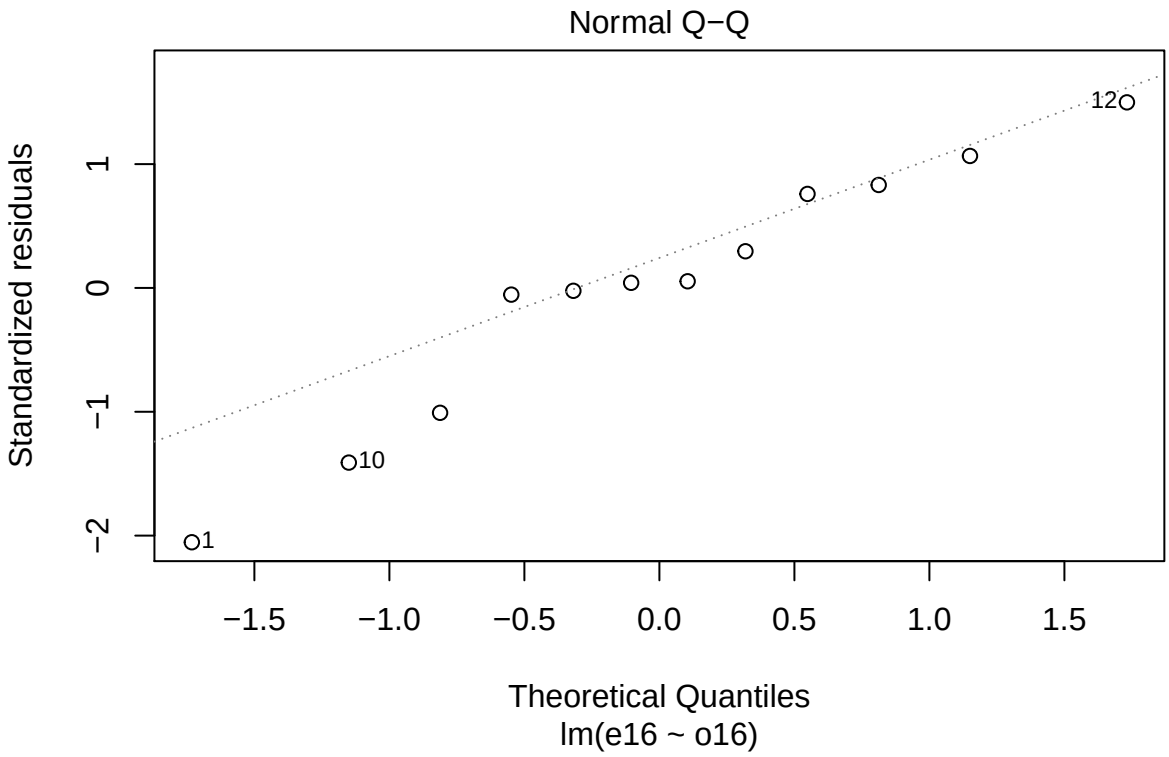
```
plot(resid(linmod), xlab="Month", ylab="Residuals",
     main="Residual Plot", pch=3, xaxt='n')
axis(side=1, at=c(1:12), labels=c("Jan","Feb","Mar",
```

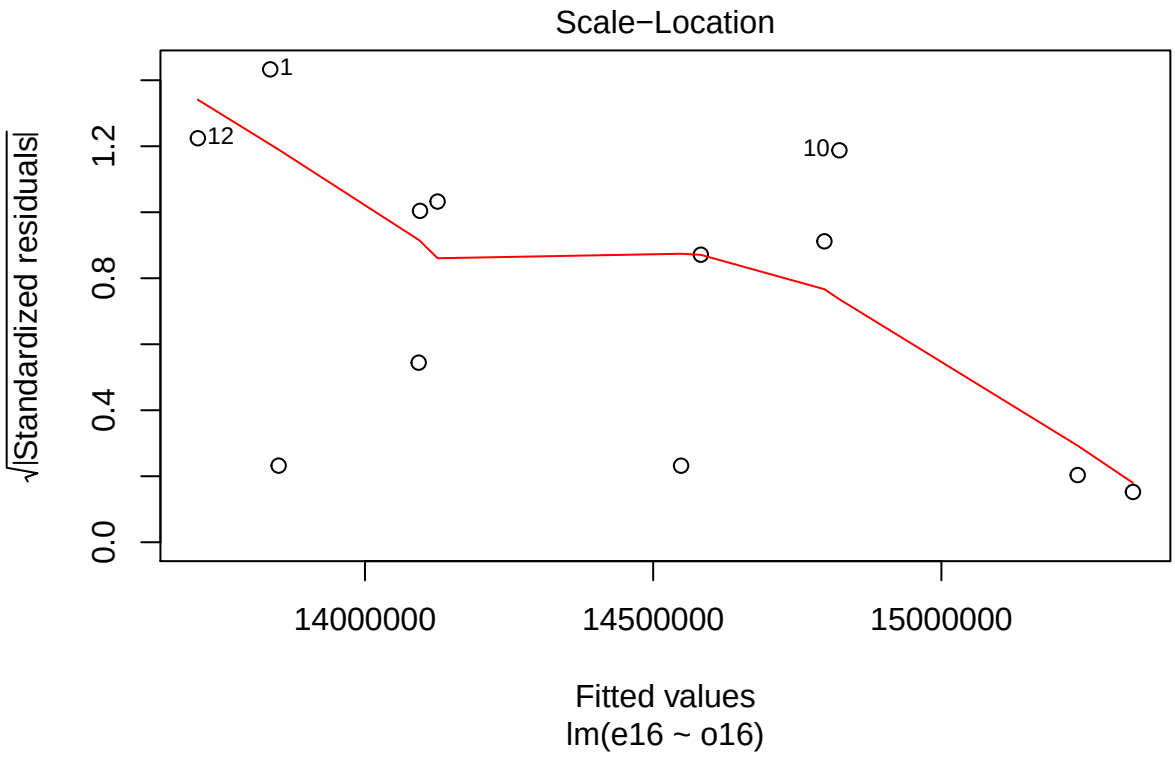
```
    "Apr","May","Jun","Jul","Aug","Sep","Oct","Nov","Dec"))
abline(0,0)
```

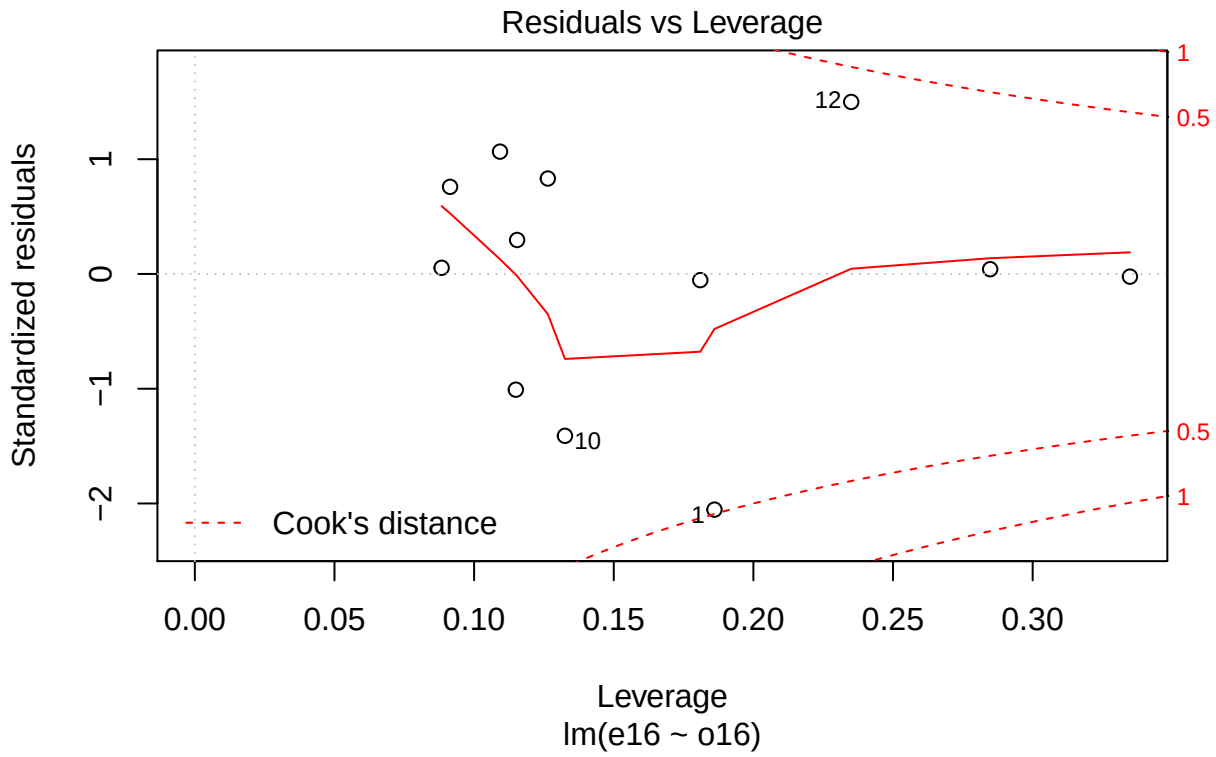



```
plot(linmod)
```


Residuals vs Fitted
12
1
10
Residuals
0e+00
−4e+05
14000000
14500000
15000000
Fitted values
lm(e16 ~ o16)


Normal Q−Q
Standardized residuals
Theoretical Quantiles
lm(e16 ~ o16)
1
10
12
−2
−1
0
1
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5


Scale−Location
√|Standardized residuals|
0.0
0.4
0.8
1.2
1
12
10
14000000
14500000
15000000
Fitted values
lm(e16 ~ o16)




```r
summary(linmod)
```

```
##
## Call:
## lm(formula = e16 ~ o16)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -419489  -61981    9783  166895  296808
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -4.516e+05  1.851e+06  -0.244    0.812
## o16          1.031e+00  1.282e-01   8.041 1.13e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 226400 on 10 degrees of freedom
## Multiple R-squared:  0.8661, Adjusted R-squared:  0.8527
## F-statistic: 64.66 on 1 and 10 DF,  p-value: 1.126e-05
```

```r
confint(linmod)
```

```
##                     2.5 %       97.5 %
## (Intercept) -4.574775e+06 3.671613e+06
## o16          7.454881e-01 1.316991e+00
```